



RDECOM-TARDEC

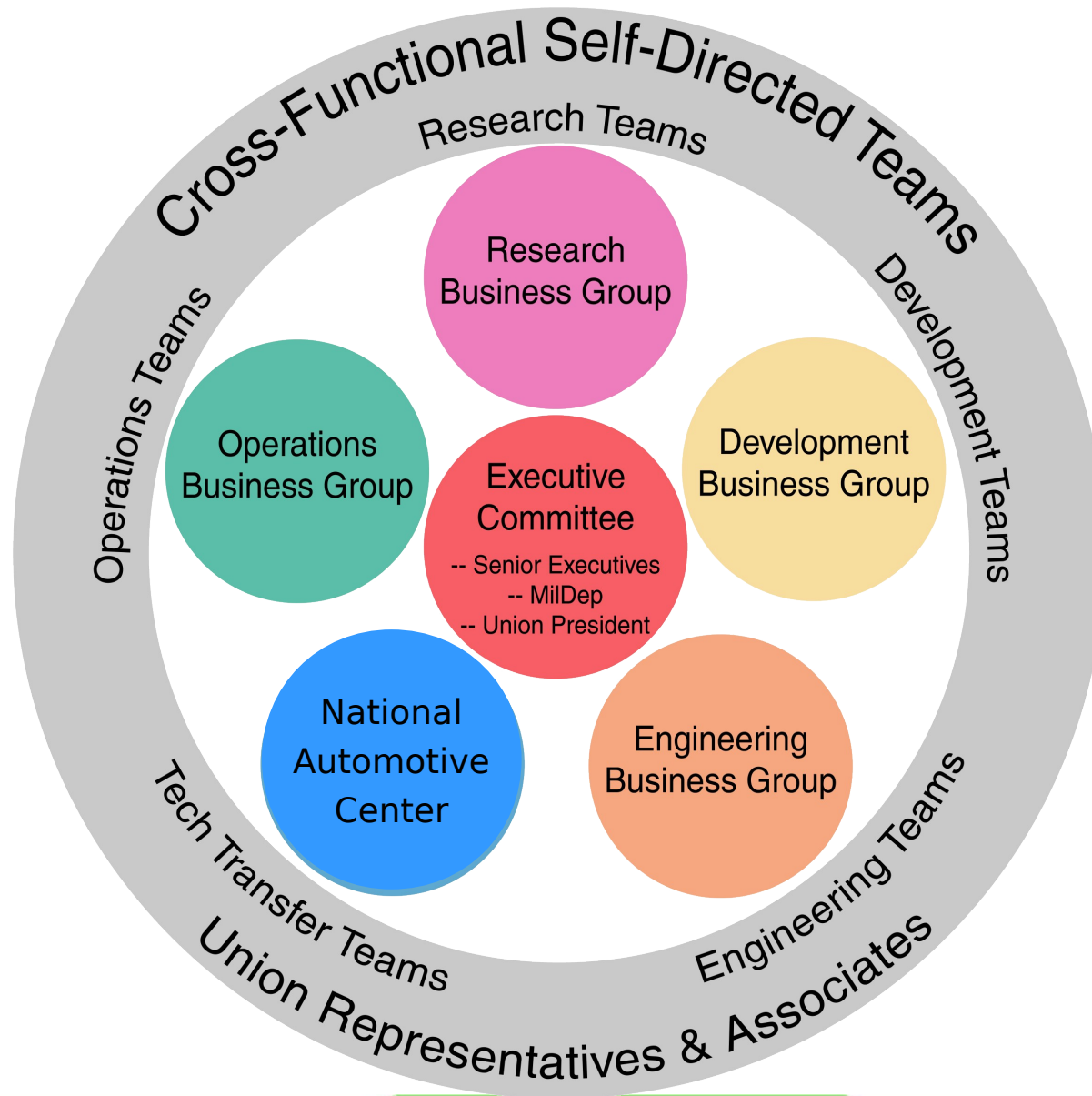
Briefing to Industry Development of Ground Vehicle Fuel Cell Auxiliary Power Units (APUs)

**02-03 November 2004
At the 2004 Fuel Cell Seminar
San Antonio, TX**

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Introduction

- **In July 04, U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) secured Army Science & Technology funding for a multi-year program to develop fuel cell Auxiliary Power Unit technology for ground combat vehicles**
 - **The program focuses on a brass board APU demonstration in FY08**
 - **The APU must fit and operate in combat vehicles, and use JP-8 fuel**
- **This briefing gives potential participants in the program an overview of the program's goals, and potential contracting strategy and schedule**

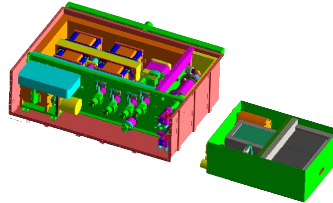
TARDEC Fuel Cell APU History

1998

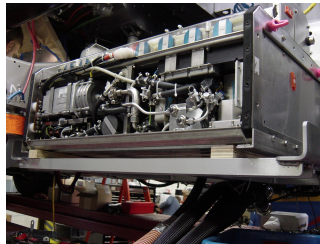


Fuel cell integration in a conventional drive heavy duty

2002



SOFC APU and reformer development



PEM APU and methanol and synthetic diesel reformer development



Regenerative PEM APU proof of concept

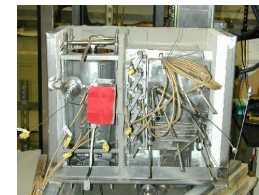
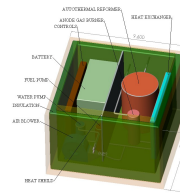
2004



SOFC reformer development

Microchannel distillation and HDS development

Microlith JP-8 gasifier and pre-reformer



Prototype integration of an microtech and PEM based low S APU



Regenerative PEM APU functional integration

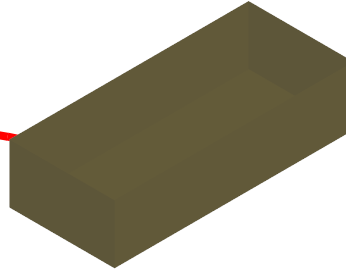
APU System Design Philosophy

- Commonality of Components
- Scalability between and within vehicle classes
- Modular design and construction
- Minimal logistics impact

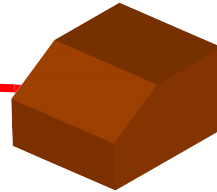
Fuel Cell APU Vehicle Under Armor Space Availability



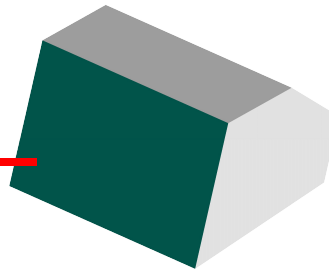
Abrams



Bradley



Stryker



Left Sponson installation,
approx volume 0.2 m^3
(30.5cm H x 53.3cm W x
124.5cm L)

Right Sponson installation,
approx volume 0.07 m^3
(38cm H x 45.7cm W x
43cm L)

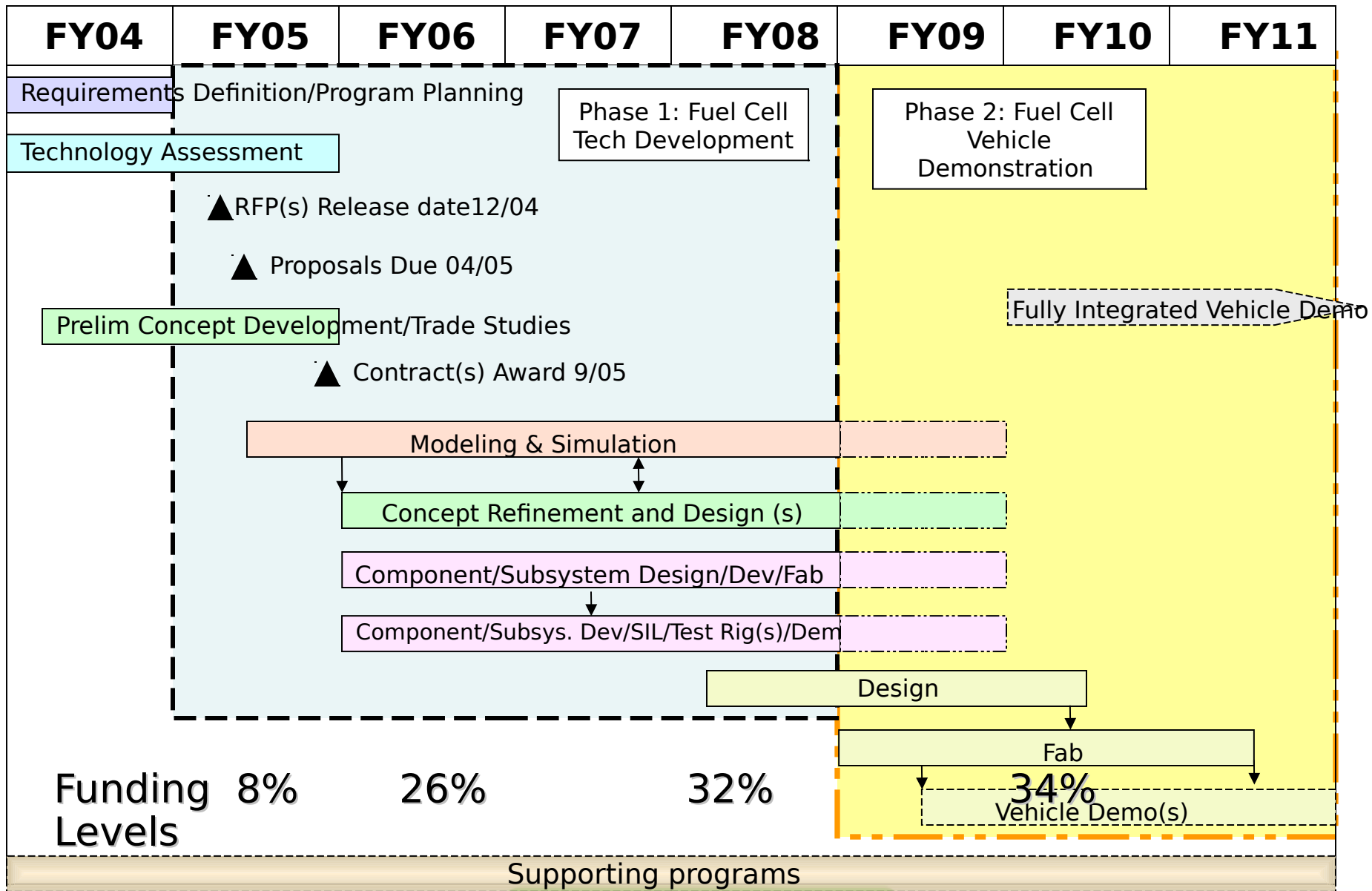
Right Nose installation,
approx volume 0.2 m^3

Target Requirements

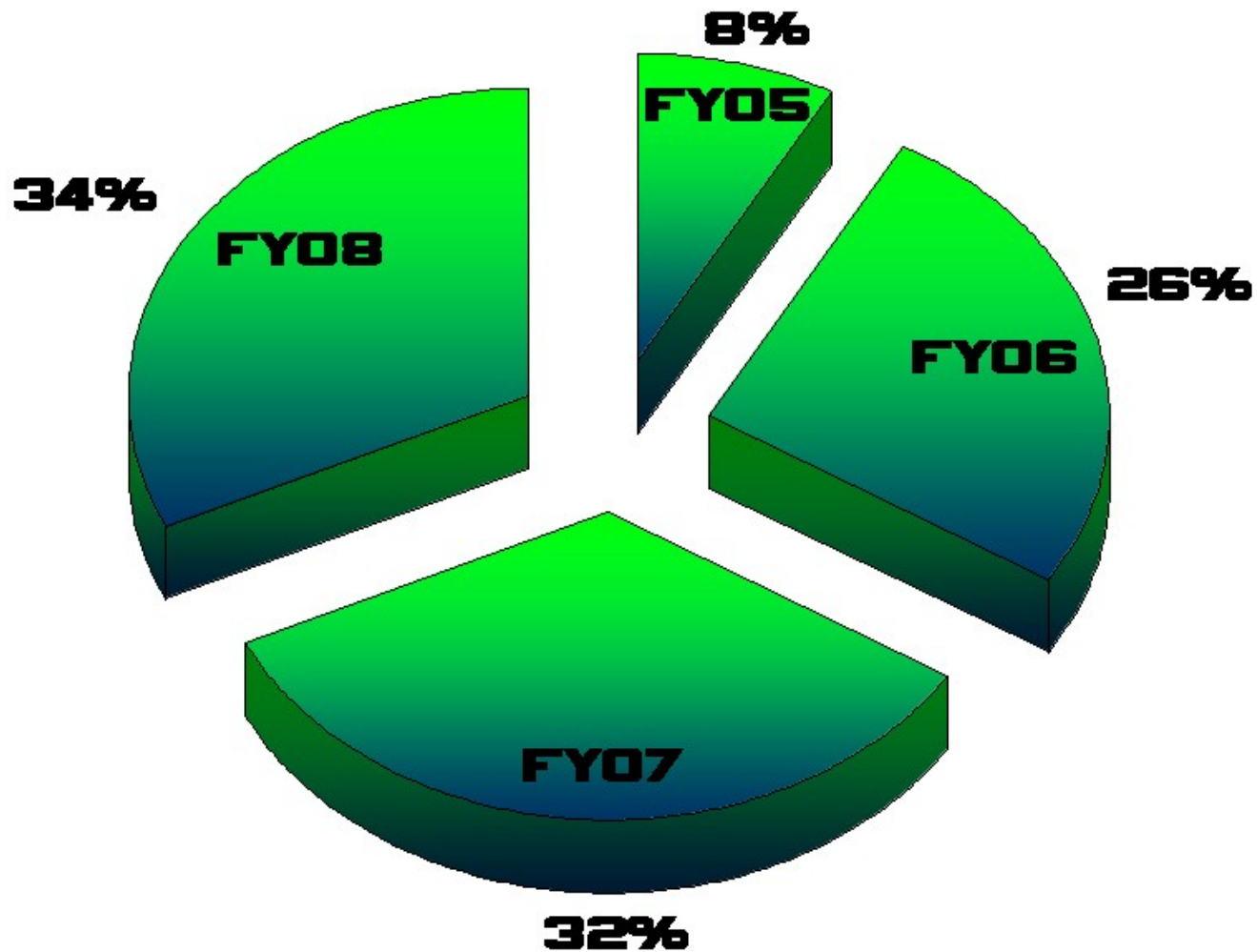
- Basic Requirements
 - Continuous power output range 5-20 kW
 - Volumetric Size = Approx 200 liters, vehicle dependent
 - 5,000 hr life, with 2,500 hr major maintenance interval
 - 10:1 turndown
 - Minimized acoustic output
 - Minimized thermal signature
- Environmental Requirements (Consistent with MIL-STD 810F)
 - Start and Operate at -18-49°C
 - Survive freezing during storage/transport

Interfaces

- Inputs
 - Worldwide JP-8 fuel (sulfur level and aromatic levels vary widely - MIL-DTL 83133E)
 - Ambient air
 - 28VDC power
 - No externally supplied water
- Outputs
 - 28VDC power
 - Waste exhaust



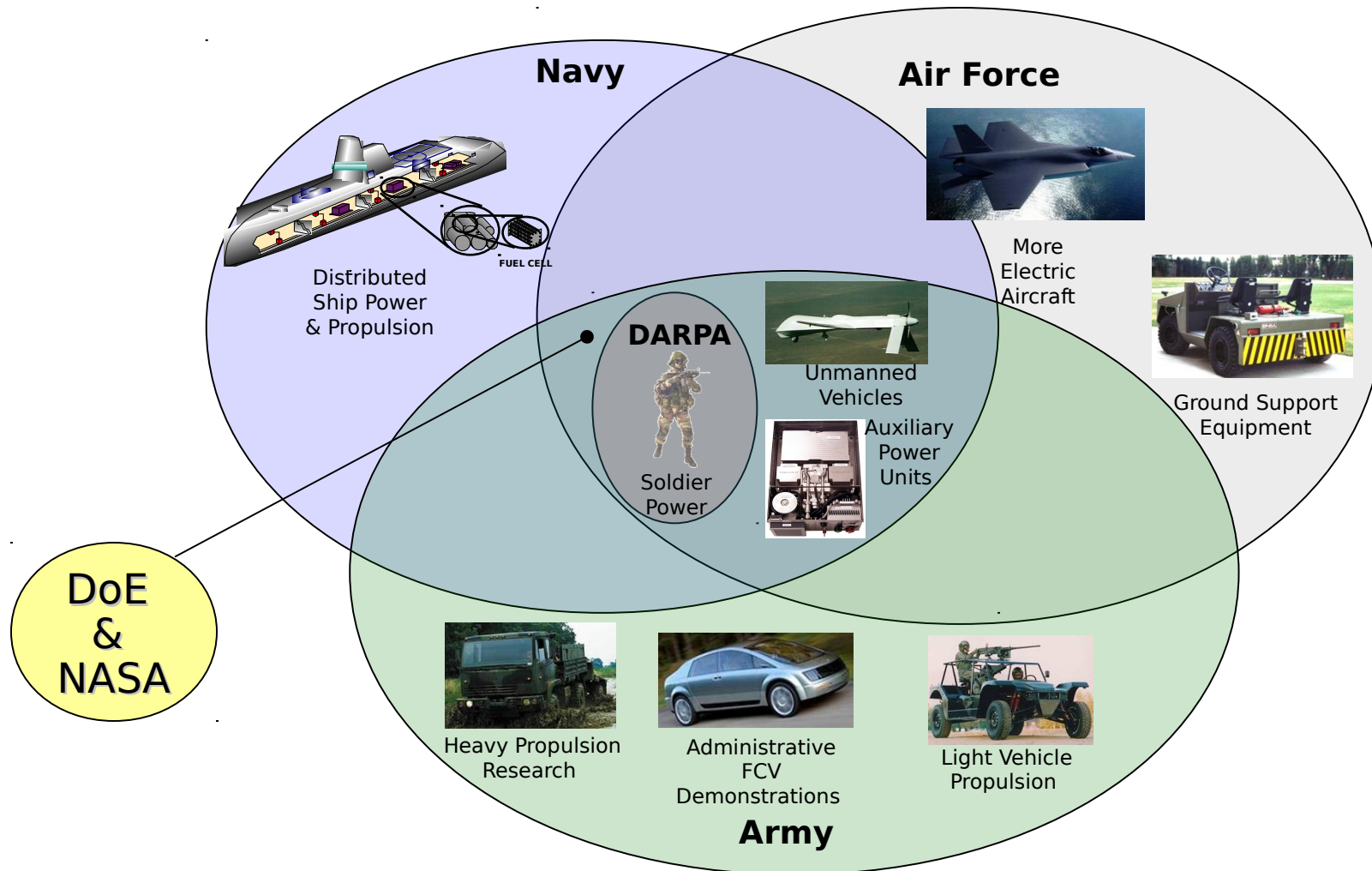
Distribution of Funds



Collaborative Efforts

- ARL and CERDEC are partners to the current effort. These centers as well as TARDEC report to the Army's Research, Development and Engineering Command.
- The team is dedicated to fostering inter-service and inter-agency cooperation to meet our goals.
- We are exploring areas of joint interest with:
 - Army Corps of Engineers CERL
 - Department of Energy – Fossil Energy
 - Department of the Navy – ONR
 - Air Force Research Lab
 - NASA – Glenn Research Center

Federal Fuel Cell Collaboration Areas



Acquistion Strategy

- We are planning to solicit for Offerors that can deliver a full brass board of an APU
- We may make up to three awards, but will reserve the right to make none
- Offerors will have to propose their approach to meet a common statement of objectives and clearly demonstrate the basis for their claims

Acquisition Strategy

- The program will likely be phased
 - Phase I is the currently approved program, FY06-08
 - Part A, component development and validation
 - Part B, brass board build and test
 - Phase II, is a possible follow-on effort for vehicle integration
- Technical evaluation will be based on the likelihood to meet the target requirements
 - The RFP will reflect the final requirements
- The proposal will be evaluated for cost
- Final evaluation criteria will be reflected in the final RFP
- A single contractor shall be competitively down selected from the phase 1 contractors

Q & A Information

The responses to your questions will be posted here.

TACOM-Warren's PRO-NET

(<http://contracting.tacom.army.mil/ssn/sources.htm>)

under

USRDECOM - TARDEC Fuel Cell Industry Day Announcement - 05-2

For additional after conference questions please email
them
to

TARDECFuelCellIPT@tacom.army.mil

Important Dates

Release of the RFP (12/04)

Proposals Due (04/05)

Source Selection (06/05)

Contract Award (9/05)